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SELECTED TRANSIATIONS ON SOVIET AGRICULTURE

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I. RESOURCES FOR INCREASING LABOR PRODUCTIVITY IN SOVIET AGRICULTURE

/Following is a translation of an article by A. Tulupnikov, candidate in economic sciences, All-Union Institute of Agricultural Economics, in the Russian-language periodical Vestnik sel'skokhozyaystvennoy nauki (Review of Agricultural Science), Moscow, Vol. V, No. 1, 1960, pages 12-22./

"In the final analysis labor productivity is the most important and essential prerequisite for the triumph of the new social order."

-- V. I. Lenin

The socialist system of the agriculture in the USSR has an immense potential for expanding production and for creating an abundance of foodstuffs for the population and raw material for the processing industry.

In December 1959, the expanded Plenum of the Central Committee of the Communist Party summed up the results of agricultural development in the country for the current year, the first year of the Seven-Year Plan. These results show that as a result of the competition among all the people for premature fulfilment of the tasks of the Seven-Year Plan, agricultural workers have scored outstanding new successes. Grain procurements amounted to 2,845,000,000 poods. In the first 11 months of 1959, meat production on collective and state farms increased by 32% and purchases by 36%. The corresponding increases for milk were 15 and 16%. In per capita production of butter, in 1959 the Soviet Union surpassed the USA. The Plenum drew up a series of measures for the further expansion of agriculture, and increase in agricultural produce, and a lowering of the cost of production through strengthening the communal economy of the collective farms. The principal source for the expansion of socialist production and accumulation, the basis for a further rise in the standard of living of the Soviet people, is a growth in the productivity of social labor.

During the 5 years from 1953 to 1958 Soviet agriculture displayed the highest rate of growth in labor productivity in Soviet history. The indices the preceding 5 years were nearly doubled. In 1958 labor productivity on the collective farms was 50% higher than in 1953; on the state farms and subsidiary state agricultural enterprises it was 41% higher. Labor expenditure per unit of produce and cost of production is decreasing more and more on collective and state farms. In 1958, for example, one expended man-day on state farms yielded 2.5 times

more produce in grain production than in 1939 and 1.7 times more than in 1953. In 1958 over 1,200 state farms expended a little over one hour to produce one center of grain.

The grandiose tasks set by the Party in the Seven-Year Plan are embodied in a concrete program of practical work in each oblast, rayon, state farm, and collective farm.

"The main thing is imaginative utilization of existing material resources. Every worker must realize that the task of overtaking and surpassing the most advanced capitalist nations in per capita production can be resolved only when we attain a higher labor productivity in industry and agriculture." (See N. S. Khrushchev, "Control Figures on the Economic Development of the Economy of the USSR for 1959-1965," /Report to the XXI Congress of the Communist Party of the Soviet Union, 27 January 1959/, (Doklad na vneocherednon XXI s"ezde Kommunisticheskoy partii Sovetskogo Soyuza 27 yanvarya 1959 g.), Gospolitizdat, 1959, p. 133.)

Several measures are required for a further uninterrupted rise in labor productivity in agriculture with the aim of increasing the output of products and lowering production costs. The most important of these are improvement of the coordination between the various branches of production in agricultural enterprises; introduction of full mechanization and increased electrification; improvement in the technology and organization of agricultural production and in the utilization of the achievements of science and advanced experience; greater use of mineral fertilizers, chemical poisons, and other chemical means; expansion of irrigation and drainage; improvement in the organization of and methods of paying labor; raising the skills and material incentives of workers; a further improvement of agricultural management.

One of the most important resources for increasing labor productivity in Soviet agriculture is the introduction of a scientifically based system of economic management and better specialization in the production of collective and state farms on the basis of proper exploitation of the natural and economic conditions of zones, regions, and individual enterprises.

It is well known that grain production in Western Siberia, Kazakhstan, the Northern Caucasus, and the Ukraine is at present 3 to 3.5 times cheaper than in the central non-chernozem zone, Byelorussia, and the Baltic region; and twice as cheap as in the Ural region. At the same time, potato raising in the central non-chernozem zone, Byelorussia, and the Baltic region is 3 times cheaper than in the Transcaucasus and Central Asia, 2 to 2.5 times cheaper than in the Northern Caucasus and Kazakhstan, and 1.5 times cheaper than in the Volga and Ural regions.

The cost of producing mutton in Central Asia, the Transcaucasus, Eastern Siberia, and the Northern Caucasus is approximately 1.5 times lower than in the central non-chernozem zone, Byelorussia, and the Baltic region.

Significant differences may also be observed in the agricultural zones in the cost of production of other agricultural products. The basic reason for these differences is to be found in the peculiarities of the natural and economic conditions of production, which are more favorable for the production of a given product in some regions than in others. Effective exploitation of these natural and economic conditions of production makes for a greater output with more produce per hectare and a smaller expenditure of labor and other means of production. Consequently, studying these peculiarities of agricultural production by zone and region in every collective and state farm, taking all these factors into account in planning and organizing production, is prerequisite to increasing output and lowering production costs in agriculture. In this connection there is special importance in resolving the problems of specialization and concentration of production, and also in the most rational combination of branches of production on every collective and state farm. The conduct of agriculture demonstrates greater economic advantages in specialization when concrete conditions are taken into account.

Questions of specialization should be examined in close relationship with the general size of agricultural enterprises. Modern large collective farms and state farms are entirely capable of maintaining a large number of cattle and sowing individual crops to an extend permitting efficient utilization of machinery and the application of advanced technology and work organization. Agricultural practice in the USSR confirms the fact that conditions are ripe for specialization not only in the various regions and collective and state farms, but also in the economic subdivisions of farms. Correct specialization must provide for a high concentration of production. Consequently, under present conditions, when the task of sharply increasing production and lowering the cost of agricultural products, especially vegetables, potatoes, milk, meat, and eggs, is especially compelling, the concentration of production has become an extremely important matter.

Calculations of the All-Union Scientific Research Institute of Agricultural Economics (VNIESKh), based on work done in one rayon of Kursk Oblast, showed that, under similar conditions, the minimum labor expenditure per centner of milk is attained in dairy sections with 1,000 to 1,200 cows. Capital investments per unit of produce are also reduced under such circumstances. In the fattening of hogs, maximum returns are achieved in livestock sections with 5,000 or more hogs and in hog-raising sections maintaining over 250 farrowing sows. In

egg production the best economic indices are registered with flocks of 40,000 or more layers; and in poultry-meat production, with flocks of not less than 30,000 to 50,000 or more broilers in one turnover (on poultry farms specializing in meat production). The development of large-scale, highly specialized production does not in the least contradict diversification in large collective farms and state farms.

In the recent past a diversified enterprise was often regarded as an enterprise of numerous but generally small and inefficient economic branches. It is obvious that a diversified enterprise with small-scale branches of production is inefficient and unjustified. There must be a definite combination of several branches of production permitting the best utilization of resources--land, machinery, and labor--but branches organized on a large scale. Furthermore, at the same time, a rationally organized economic enterprise is justified in maintaining some less profitable branches of production in addition to the principal and highly efficient ones. The benefits of having in one enterprise branches of production of varying profitability stems from the fact that they have different requirements for labor resources (as a whole and seasonally), technology, capital expenditures, and land. Combining these branches makes it possible to utilize fully existing resources of land, labor, and capital and to raise the labor productivity, income, and profits of the enterprise.

An example of a methodical approach to the definite specialization and combination of branches of production may be furnished by the seven-year plan of the "Il'ich's Path" Collective Farm of Klinskiy Rayon, Moscow Oblast. This collective farm is located in the northwestern zone of the oblast, which is mainly devoted to dairying and vegetable raising. The natural and economic conditions of the farm favor the production of milk, vegetables, and potatoes as major commercial products.

The present-day splintering of this collective farm's livestock husbandry prevents rational organization. For example, 346 cows are kept in seven different locations, 570 head of young beef in 10 places, pigs are raised in six different places, etc. This limits the possibilities of mechanization, leads to increased labor costs and overhead, and hinders the introduction of new, more progressive technology and, consequently, a growth of labor productivity and a reduction of the cost of production.

In order to eliminate these shortcomings, improve the organization of labor, and simplify the administration of the economy, the farm's seven-year plan provides for an economically-based location of livestock sections and labor-consuming crops according to populated points and

and regions. It also provides for the internal specialization and concentration of production. In the prospective dairying points it is planned to organize crop rotations primarily of silage crops, root fodder crops, and perennial grasses (for hay), which will eliminate the distant hauling of fodder that does not easily withstand transportation. On the lands assigned to hog-raising sections, potato and grain crop rotations will predominate. At all the livestock-raising points there will be cultivated pastures providing green fodder from early spring to late fall. In working out the plan it was decided to merge the crop rotations, reducing them from 14 to five innumber.

The farm's seven-year plan provides for the following organization of the land: 71% of the general area is to be put under cultivation, 29% cultivated as pastures and meadows. Under this organization there is proposed for each 100 hectares of land: 50 head of beef cattle, including 25 cows; 48 hogs, including two farrowing sows; 27 sheep, including 12 ewes; 400 fowls, including 180 laying hens. Such a quantity of livestock and poultry will sharply raise the efficiency of land utilization. In 1965, for every 100 hectares of agricultural land it is planned to produce 900 centners of milk as compared to 370 in 1958, 125 centners of meat (live weight) in place of 42,850 centners of vegetables in place of 137, and 1,600 centners of potatoes in place of 750 in 1958. With such specialization, concentration of production, and combination of branches of production, the total gross product in 1965 will grow 2.8 times -- and marketable produce, 3 times -- as compared with 1958.

A second variant of the plan would combine branches of production with a more intensive specialization of the collective farm, production being limited predominantly to milk, potatoes, and vegetables. This would make possible a greater output per worker and hectare of land and a greater reduction of labor cost. Here, for every 100 hectares of agricultural land there would be a quota of 50 cows instead of the 25 under the first variant, 2,000 centers of milk instead of 900, 2,160 centers of potatoes instead of 1,600, and 1,750 centners of vegetables instead of 850. The value of the major commercial products, that is, milk, potatoes, vegetables, and meat, would amount to 450,000 rubles per 100 hectares of cultivated land instead of 310,000 rubles, or 1.5 times higher than under the first variant. Such a reorganization would lead to a greater increase in the productivity of the farm and would raise its income and profits.

Rational specialization and concentration of production with a correct combination of the branches of production would be attained by drawing up, introducing, and improving systems of scientific management for all collective and state farms. Furthermore, combining the systems of the scientific management of collective farms, state farms, rayons,

oblasts, and zones would form the basis of a rational allocation of all agricultural production. An economically expedient allocation of agricultural production, taking full account of zonal conditions and peculiarities, should be reflected in state purchase plans, the level of purchase prices, and in credit plans, material-technical supply, plans, and other means of stimulating the production of a certain product, especially in regions where commercial production has low production costs. State purchases of agricultural products in regions of highest marketability and lowest production cost will make it possible to put at the lowest cost the necessary quantity of agricultural produce at the disposal of the state. This will lead to systematic reduction of the retail prices of foodstuffs and consumers' goods.

Under the present conditions of Soviet economic development, the most important factors for a growth in labor productivity in agriculture are continuous technological progress, the replacement and improvement of machinery, and the full mechanization and automatization of production processes, based on the employment of a system of machinery meeting the production needs of the individual zones of the country. The mecharization of socialist agriculture have social as well as economic implications. They answer the daily requirements of rural workers, lighten and radically change the character of the labor of millions of people, reduce the length of the working day, and eliminate the essential differences between mental and physical labor.

During the Seven-Year Plan the material-technical base of agriculture will be expanded by supplying-directly to collective and state farms over one million tractors, about 400,000 combines, a huge number of different machines of advanced design, and other equipment. With the electrification of all collective and state farms in 1959-1965, the demand for electric power in the rural areas will increase by nearly 4 times. According to tentative calculations, this will reduce production expenditures in agriculture by more than 19,000,000,000 rubles.

A system of machinery should make possible the full mechanization of all work-consuming processes in crop raising and livestock raising, particularly in raising and harvesting industrial crops, potatoes, and vegetables; handling and drying grain; and gathering and hauling straw. Mechanization should also extend to work in livestock sections, loading and unloading, drainage, and irrigation. The production of agricultural machinery should reach a level where full mechanization of all agricultural work and the utilization of technology make possible the fulfillment of all work tasks on collective and state farms during the most favorable agrotechnical periods with a minimum expenditure of labor and capital. Increasing the output of the best machinery and

and equipment for livestock sections will in a very short time lead to the complete mechanization of milking on collective and state farms, the mechanical watering and automatic feeding of cattle, and the mechanized cleaning of barns.

Calculations indicate that if collective farms were furnished with additional haying machinery of an approximate value of 800,000,000 rubles, the fodder harvest of collective farms could be increased by 15 to 16 million centners at a minimum labor cost and without expansion of the fodder-crop areas. This would produce an additional 1,400,000 tons of milk or 200,000 tons of meat. Consequently, the cost of producing and acquiring these machines could be compensated by surplus production in the first year. Besides, if hay were harvested by balers, reducing the loss of protein and nutrients, the level of production would rise even more. Full mechanization of sugar beet raising and the sowing of single-sprout seeds would reduce labor expenditure 5 to 8 times per hectare and open great possibilities for concentrating the sowing of sugar beets.

Improvement of agricultural technology should proceed along the lines of the use of mounted machinery, self-propelled chassis, and wheeled tractors with low-pressure tires. Other improvements include devising multi-purpose machines, raising operating speeds, and producing machinery with automatic control, applying industrial methods in organizing their production. Tractors, combines, and other machines and equipment must be constantly modernized and less efficient machines replaced by more efficient and economical machines of better design and lighter weight. In addition, it is necessary to strive for a more efficient utilization of machinery. Time-study data indicate that tractors are operated during 55 to 60% of the possible working time of a working day. During the remaining time they are idle because of technical deficiencies and for organizational and other reasons. Tractors are insufficiently loaded during field work, and the net working time of the machine-tractor pool is 50 to 55%.

The effectiveness of the use of machinery depends to a significant degree on maintaining it in working condition. It is necessary to eliminate deficiencies in the organization of repair work in agriculture. On the basis of existing work shops and repair shops a network of enterprises for the major overhaul of tractors and agricultural machinery should be organized, where old, worn parts and units can be replaced by new ones. The industrial production of parts and units for tractors, agricultural machinery, and trucks should fully satisfy all the requirements of collective and state farms.

In order to improve repair work in agriculture, economical periods of tractor and machine service should be established, since the expense of repairing old tractors and machines often exceeds their original value.

A careful calculation of the requirements of collective and state farms calls for an increase in production and in material and technical capital. At the same time, it is necessary to improve the system of the material-technical supplying of collective and state farms by reducing the large number of supply organizations, sharply cutting down the number of intermediate links in the supply system, and reducing turnover expenses.

Increasing the production of grain and the use of it as livestock feed require an expansion in the construction of granaries, grain-drying buildings, and feed-processing buildings on collective and state farms. The equipment of state procurement points and elevators with buildings and facilities for cleaning and drying grain would make it possible for collective and state farms to deliver grain to the state directly from the field.

Of great importance in promoting agricultural progress in the near future is the growth in the use of mineral fertilizers, chemical poisons, and other chemical means. The production and expansion of different types of mineral fertilizers in our country is receiving special attention. In 1965, 31,000,000 tons of mineral fertilizer will be produced in comparison with 10,600,000 tons in 1958. In place of the 11 types of fertilizer of 1940 and the 14 types of 1954, the chemical industry of the USSR turned out 21 types of fertilizer in 1959.

Year after year the supply of mineral fertilizers is improving not only for commercial and truck crops, potatoes, orchards, and vineyards, but also for grain and fodder crops and natural meadows and pastures.

In addition, one of the most important requirements is the proper organization of accumulating, storing, and applying manure to the soil. Many advanced collective farms and state farms have set up their own organic fertilizer plants and have built manure storage sheds and liquid manure repositories. Every year they conduct a large-scale preparation of manure and earth and other compost fertilizers and then apply them to the soil. Because of this the farms obtain high and steady yields of all crops.

The production of organic fertilizers in the form of highly concentrated manure mixes and in convenient bags facilitates application and prevents the loss of active substances and the deterioration of quality. At present, industry turns out mineral fertilizers of low concentration (on the average with not more than 30% active substance), making it necessary to transport annually a useless weight exceeding the useful substance. In loading, hauling, and unloading the minimum loss of fertilizer is therefore 15%. For the non-chernozem regions the production of lime must be increased, and for regions with salt soils gypsum is needed.

Crops in the Soviet Union suffer severely from harmful insects, rodents, and diseases. Consequently, it is necessary to expand greatly the production of a wide assortment of chemical poisons and preparations, to improve their quality, and to lower their cost. Wide-scale use must be made of chemical methods of killing weeds. The annual application of weed killers over even 50% of the grain crop would increase the country's gross grain harvest by 800 to 900 million poods a year. It is necessary to begin the mass production of chemical preparations raising the digestibility of fodder, speeding up the growth of crops, hastening ripening, and raising the quality of products; the production of artifical protein fodder, especially urea compounds; and the production of preparations for separating fiber from the stems of flax and other fiber crops without spreading or retting. Chemicals should be widely used for the preservation of quick-spoiling agricultural products and also in storing succulent fodders.

Synthetic materials should find broad application in agriculture: plastics in hothouse culture, ensilage, grain storage, piping for irrigation, livestock husbandry, etc. For irrigated lands wide use is being made of plastic fabrics in the manufacture of movable flexible piping. These pipes do away with the necessity of constructing a temporary irrigation network. The testing of flexible pipes on irrigated lands sown with cotton, corn, potatoes, vegetables, and perennial grasses has demonstrated the advantages of this new method. By this means the utilizable area on irrigated lands increases by 3 to 4%. The value of the harvest gathered on the extea area in one year often exceeds the expenses of installing flexible piping.

The use of chemicals in agriculture not only constributes to an increase in amount of products and a rise in quality, it also makes agriculture more independent of unfavorable climatic, soil, and other conditions.

Another important means for the intensification of socialist agriculture and a resource as regards increasing labor productivity is irrigation. Increasing the irrigated area represents one of the most effective methods of influencing the elemental processes of nature.

In the USSR land reclamation assumes mangificant proportions. In 1957 there were 11,200,000 hectares of land within the irrigation networks, that is, 2.8 times more than in 1913. Based upon irrigation the most advanced cotton raising in the world is found in the Soviet Union. Irrigation has altered the distribution of many agricultural crops. Areas which were barren deserts for centuries are now flourishing industrial orchards and vineyards or lands used for raising cotton, silkworms, and sugar beets. In areas of excess moisture, swamp drainage, brush uprooting, and turf breaking are required. The most effective and economical method of drainage, in comparison with open channeling, is closed drainage, by means of which it is possible to use agricultural machinery and advanced agro technology on drained lands. In 1913 there were 2,000 hectares of drained land in Russia, while in the USSR, in 1956 there were nearly 7,000,000 hectares of drained land. In the current Seven-Year Plan land reclamation is to proceed on a large scale on the collective and state farms of many regions. As a rule, the returns from reclaimed lands are very great.

The All-Union Scientific Research Institute of Agricultural Ecnomics is participating in the development of a scientific system of agricultural management in Ryazan Oblast, in which are located most of the Meshcherskiy lowlands and the Oka floodplain. Rough calculations indicate that carrying out land reclamation in Ryazan Oblast over an area of 350,000 hectares will result in an increase of milk by 120,000 tons, of potatoes by 460,000 tons, and of vegetables by 500,000 tons.

The results of land reclamation may be demonstrated by the example of the "Academician Pavlov" Collective Farm of Ryazanskiy Rayon. During 1956-1958 the farm spent less than 500,000 rubles to drain and break 2,000 hectares of swampland, receiving from this area produce worth 3,700,000 rubles and a net income after sales of 1,800,000 rubles. Irrigated and drained land produces greater results if it is intensively farmed. Therefore, the application of organic and mineral fertilizer on such land is essential.

A very important factor in raising the productivity of labor in agriculture is improvement in the organization and technology of production and the application of the achievements of science and advanced experience in agricultural work. For example, in arid regions mainly devoted to grain raising, shelterbelt planting and deepplowing without moldboards (in Kazakhstan and Siberia) contribute to high yields and a

growth in agricultural production. In all regions of the Soviet Union high yields may result from sowing grain in close rows and cross rows and from sowing corn, sugar beets, cotton, sunflowers, etc., in square clusters.

In regions of sufficient moisture, cultivated fallow should be introduced. There are about 5 million hectares of uncultivated fallow in the non-chernozem belt. Replacing uncultivated fallow by cultivated would produce an additional 4.5 million tons of fodder, which in turn would produce approximately 40,000,000 centners of milk. Also of great significance is the sowing of supplementary crops between rows. Increments in grain yields range as high as 3 to 5 centners per hectare after the application of organic-mineral fertilizer mixtures.

An increase in the number of purebred cattle and poultry on collective and state farms and the introduction of artificial insemination and industrial crossbreeding leads to a sharp rise in the productivity of livestock husbandry. The practice on collective and state farms has demonstrated that increasing the number of special meat-producing breeds of animals contributes to an increase in production and to lowering the cost of production of beef. In the United States, for example, the number of meat-type cows is being systematically increased. In 1930, out of 32,200,000 cows in the U.S., 23,000,000 were dairy breeds and only 9,200,000 were meat breeds; in 1958, out of 46,800,000 cows 22,400,000 were dairy breeds and 24,400,000 were meat breeds.

Experience bears out the advantages of the broad application of the nonstall method of raising beef cattle, the group method of raising calves with milk cows, and the wide-scale organization of the pasturing and fattening of beef cattle. Other effective practices in livestock husbandry are raising hogs in large groups with self-feeders and the intensive utilization of farrowing sows; organizing winter and early spring lambing; the wide application of the walking pen method of raising chickens on deep, unchanged bedding; the use of natural ponds for the mass raising of aquatic poultry; ground ensiling and the use of combination feed mixes with the addition of microelements, antibiotics, and vitamins. The introduction of these methods in production would raise the output per head of livestock and poultry and lower labor and capital costs. If cattle were raised loose with free access to coarse fodder and silage, based on self-feeding, the full mechanization of their care, and the advanced organization of labor, expenditures for buildings and equipment would be greatly reduced, and the cost of labor would be twice as low.

On the Pyatigorskiy State Farm in Stavropol' Kray, the stall raising of cattle requires 12.9 man-hours of labor to produce one centner of milk, while raising them loose requires only 4.6 man-hours. On the Proval'skiy State Farm in Lugansk Oblast, the corresponding

figures are 12.6 and 5.7. On this state farm, further systematization of techniques and the organization of production have been proposed with a view to reducing labor costs for the production of a centner of milk to 2.3 man-hours, as compared with the 4.7 required for the production of a centner of milk in the United States.

On the Lenin Collective Farm in Stavropol' Kray, after converting to the loose raising of cattle, the productivity of labor in livestock raising increased 4 times. On the Katenneki State Farm in the Latvian SSR, as a result of the large-scale stall-less raising of hogs, the useful area of pigsties was enlarged and labor productivity was sharply increased. Self-feeders and automatic watering troughs have been installed, and manure is removed with the aid of a regular fire hose. The pigsties are now able to accommodate 700 hogs instead of 130, and the working day does not exceed 7 hours. The annual cost of producing a centner of pork on this farm was reduced by 400 rubles.

Improvement of the fodder base, primarily through the expansion of the area sown with corn, and the reduction of labor and capital costs in fodder production depend to a large degree on sedd quality. It is also necessary to expand the sowing of leguminous crops and fodder grasses having a high protein content. Special attention should be given to the organization of the combination-feed industry. Facilities for the production of combination feeds on collective and state farms based on their own fodder resources should be established.

The data of experimental stations and the experience of collective farms in the Estonian SSR, Leningrad Oblast, Moscow Oblast, and elsewhere demonstrate that pastures sown with perennial grasses are able to yield from 3,000 to 5,000 kilograms of fodder per hectare. The productivity of pastures increases 5 times or more when fertilized, sown with grasses, and cleared of brush and mounds. A cow maintained on such pastures, even without concentrated feeding, can give 20 to 25 kilograms of milk a day.

An important factor in increasing labor productivity on collective and state farms is improvement in the organization of labor. The flood of new agricultural methods and the wide scope of mechanized work in agriculture are creating new principles and forms of labor organization.

On collective farms having large areas of corn, sunflowers, and other row crops, the highest labor productivity is attained with the use of mechanized work teams of six to seven operators. Each such team raises and harvests an area of 500 to 700 hectares of row crops. The members of the team are acquainted with all types of machinery and are able to cooperate effectively at needed times. This makes for great maneuverability on the part of the team, the best utilization of technology, and high labor productivity. Our collective farms often have as much as 1,500 to 2,000 hectares of row crops. Using the highly efficient

group-method of operating machinery, they have all the prerequisities for a better and more productive use of technology and a growth in labor productivity.

A decisive prerequisite for a growth in labor productivity and an increase in agricultural production is an increase in the material incentives of workers. Recently many collective farms have introduced guaranteed wages, in which evaluations in labor days are replaced by monetary values for work norms or units of produce. However, the level of monetary evaluations depends on the economic strength of each collective farm.

Experience has demonstrated that the introduction of guaranteed wages sharply increases the work output of collective farmers, strengthens labor discipline, and stimulates the growth of productive labor. The sale of machine-tractor station machinery to the collective farms, the introduction of the new method of procuring agricultural products, and the establishment of uniform zonal prices for these products have created conditions for increasing the gross and marketable produce of collective farms, a growth in monetary income, and a rise in the proportion of money in recompense to collective farmers. All this will contribute to the introduction in the near future of guaranteed monetary wages on all collective farms.

Of great importance in increasing collective-farm production is the use of cost accounting. The conversion of brigades and livestock sections to internal cost accounting makes possible the payment of collective farmers, specialists, and supervisors in accordance with the fulfillment of gross production and cost plans.

Together with the introduction and improvement of a monetary wage system on collective farms there should be a distribution of material and spiritual benefits along the lines of social services. A systematic increase in deductions from collective-farm income for the construction of child institutions, communal dining halls, schools, hospitals, clubs, rest homes, sanatoria, etc., will contribute to an expansion of social services, and to a gradual conversion to more modern forms of distribution on collective farms, thus bringing the way of life of collective farmers closer to that of city workers.

Soviet agriculture has inexhaustible resources for a growth in labor productivity.

At present all collective and state farms in the USSR, in accordance with the decisions taken by the December 1959 Plenum of the Central Committee, are working out steps to increase production in all branches of agriculture.

In this connection, through the wide-scale introduction of the experience of advanced farms and innovators and the discoveries of science, there are prospects for a better utilization of technology, a sharp improvement in agricultural practices, a steady growth in labor productivity, and, on this basis, premature fulfillment of the tasks of the Seven-Year Plan on every farm. All this will lead to a fuller development and mobilization of the inexhaustible resources of socialist agriculture and to premature realization of the mangificent prospects outlined in the resolutions of the XXI Communist Party Congress.

II. GREAT RESOURCES FOR INCREASING GRAIN PRODUCTION

/Following is a translation of an unsigned article in the Russian-language periodical Ekonomika sel'skogo khozyaystva (Agricultural Economics), Moscow, Vol. XXXI, No. 3, March 1960, pages 1-10/

The Plenum of the Central Committee of the Communist Party of the Soviet Union, meeting in late December 1959, passed resolutions on the fundamental problems of progress in socialist agriculture. Among these the problem of a further increase in grain production in our country is of special importance.

The Communist Party of the Soviet Union, which implements measures for agricultural progress, has always allotted a great deal of attention to all methods of increasing grain production as the basis of all agricultural production.

Successful resolution of the problem of increasing grain production is the prerequisite of progress in all branches of agriculture, systematic location and specialization by zones, and an increase in the production of sugar beets, cotton, flax and other industrial crops; potatoes, vegetables, fruit, grapes, and other agricultural products. An increase in animal products also depends on progress in grain production.

During the last few years great success has been attained in Soviet grain raising, as is indicated by the following figures:

	1913 (within present boundaries)	1940	1953	1958
Total grain area, millions of hectares	104.6	110.5	106.7	125.2
Yield in centners per hectare	8.2	8.6	7.8	11.3
Gross grain harvest, millions of poods	5,253	5,830	5,036	8,621
State grain procurements, millions of poods	---	2,225	1,899	3,472

The grain area in 1958 was 20,600,000 hectares, or 20% larger than in 1913, and 18,500,000 hectares, or 17%, larger than in 1953. The gross grain harvest in 1958 increased by 3,585,000,000 poods, or 71%, over 1953; and state procurements increased by 1,573,000,000 poods, or 83%, over 1953. In 1958 the gross grain harvest was 8,621,000,000 poods. Such a quantity of grain is unprecedented in the history of our country.

Aided by a powerful socialist industry and the support of the working class, agricultural workers have attained outstanding successes in 1959 in realizing the agricultural-development program drawn up by the XXI Party Congress and the December 1958 Plenum.

The collective and state farms overfulfilled the sowing plan for spring crops in 1959 and brought the general sown area up to 196,300,000 hectares, nearly 40,000,000 hectares more than in 1953. The area sown with corn covered 22,400 hectares.

In spite of the drought in several large grain-growing regions in 1959, preliminary data indicate a harvest of 7,600,000,000 poods. This exceeds the average annual grain harvest during the period 1954-1958 by 700,000,000 poods, and the average annual harvest of 1949-1953, by 2,700,000,000 poods. The atate procured 2,846,000,000 poods of the 1959 grain harvest, or nearly 200,000,000 poods more than the average annual procurement of 1954-1958 and 947,000,000 poods more than in 1953.

All the Soviet people are proud of these achievements. Today grain raising rests on a firm foundation; but this does not mean that less attention can be given to the production of grain.

In his address before the June 1959 Plenum of the Central Committee, N. S. Khrushchev said: "In general we have solved the grain problem, but only in a relative sense, since the urban population is constantly growing and the demand for grain is increasing. Furthermore, we have not yet fully solved the problem of meeting the demands of the working class for livestock products; and these problems, that is, the problems of grain production and livestock production, are mutually related. Thus we cannot afford to detract our attention from the task of raising grain."

The December 1959 Plenum again drew the attention of collective farmers, state farm workers, agricultural specialists, the workers in soviet and Party organs, and all Soviet workers in general to the grain problem and to the necessity of a fuller utilization of existing potentialities and resources for a more rapid increase in grain production.

The Plenum declared that an essential task of locak Party, soviet, and agricultural organs and collective and state farms is to increase grain production to no less than 10-11 billion poods a year in order to create a more stable supply of commercial grain.

In order to increase gross grain production, the December Plenum has set forth the following basic measures:

1) An increase in the area sown with grain by opening new lands, replacing uncultivated fallow by cultivated fallow in moist areas, and examining the structure of the sown area, with a view to replacing low-yielding crops with more productive crops and expanding the area sown with corn.

2) A definite improvement in the agricultural practices of all collective and state farms, strict observance of the proper scheduling and quality of all agricultural operations, an increase in the supply and better utilization of local fertilizers, and conversion to the sowing of selected seed only with a view to attaining higher yields and stable harvests.

"In our country," declared the resolutions of the Plenum, "all the necessary conditions have now been created for a further upsurge in all branches of agriculture. The movement begun by advanced collective and state farms to overtake and surpass the United States in per capita production of meat, milk, and butter is proceeding on a wide scale. The socialist competition developed in republics, krays, and oblast, indicates that the goals of the Seven-Year Plan for agriculture will be fulfilled ahead of schedule."

The December Plenum of the Central Committee, drawing upon the experience of advanced collective farms and state farms, rayons, and entire oblasts, has shown that the Seven-Year goals for agriculture can be fulfilled in a shorter period of time.

What potentialities and resources exist for further increasing grain production in the near future? This is clearly and precisely set forth in the resolution of the December Plenum, in comrade N. S. Khrushchev's address before the Plenum, and in the reports and speeches of participants in the Plenum.

In the main we are short of feed grain and fodder for the requirements of communal livestock husbandry. Feed grain and other types of fodder may be acquired without special expense by collective and state farms through the replacement of uncultivated fallow by cultivated fallow. At present there are altogether in the USSR about 24,000,000 hectares of uncultivated fallow. Calculations show that

approximately 6,000,000 hectares of uncultivated fallow can be converted to cultivated fallow in the moist zones and 6 to 7 million hectares in Kazakhstan, Siberia, and the Urals.

As is known, uncultivated fallow is an important means of accumulating moisture and nutrients in the soil and also of fighting weeds. Therefore, uncultivated fallow in zones of insufficient moisture is necessary and economically justifiable in the crop-rotation system. But in zones of sufficient and excess moisture uncultivated fallow should unconditionally be replaced by cultivated fallow. The major purpose of uncultivated fallow -- accumulation of moisture -- is already satisfied under these conditions, and nutrients can be provided through the application of additional organic and mineral fertilizers. As to the elimination of weeds, this can be achieved through chemicals or by the well-known methods of stimulating the growth of weeds after the harvest season. The experience of many farms confirms the great advantages of converting from uncultivated to cultivated fallow.

In the next few years the area sown with grain (including corn harvested for silage and livestock feed in a milky-waxen stage of maturity) can be increased by several million hectares over 1958. This should be done mainly through the replacement of uncultivated fallow by cultivated.

In the Ural region, the Volga region, Siberia, and the Far East it is planned to open 8 to 9 million hectares of new lands. In the northwest region and the central non-chernozem zone, work is under way to develop wastelands, brush areas, swamps, and floodplains. It is planned to put about 3,000,000 hectares of such land under cultivation. Calculations show that, as a result of these measures, including the replacement of uncultivated fallow by cultivated, the annual gross harvest of grain can be increased by almost a billion poods.

The main source for an increase in the gross grain harvest and other agricultural products is at present a rise in yield. According to comrade N. S. Khrushchev at the December Plenum, "the way to increased production is not through extensive methods of agriculture, based mainly on the expansion of the sown area, but through highly effective intensive production on each hectare of land and with each unit of labor."

The experience of many farms and even rayons and oblast shows that there are unlimited resources for raising the yield. This is especially evident in comparisons of the grain yield from selected seed as against that from ordinary seed. In 1958, on experimental plots sown with selected seed, the average yield per hectare was 7.9 centners more than in the case of the control plots. This means that if all

collective and state farms were to attain such yields as those on the experimental plots, the country would obtain 6 million more poods of grain!

In order for every farm to attain this result it is only necessary to convert to the generally accessible methods of agriculture used on the experimental plots and the advanced collective and state farms.

For solving the main problem in the development of grain raising -- improving yields and securing stable harvests -- we now possess all the prerequisities: the technical equipment of agriculture has grown and will grow even more in the next few years, the collective and state farms have skilled cadres, rich experience has been acquired in opening and properly exploiting new lands, and the area sown with such valuable grain crops as corn has been expanded.

Year after year the army of skilled harvesters is increasing. A very important resource lies in the application of their experience and the achievements of agronomical science. Many regions, collective farms, state farms, and production innovators produce high yields of grain on large areas.

In Ternopol' Oblast the average corn yield was 40 centners of grain per hectare on an area of 38,000 hectares, and the average yield of green fodder including ears was 550 centners from an area of over 100,000 hectares.

The team of Evgeniya Dolinyuk of the Stalin Collective Farm, Mel'nitse-Podol'skiy Rayon, Ternopol' Oblast, obtained 1,605 centners of green corn fodder per hectare from an area of 105 hectares and 223 centners of grain per hectare from an area of 20 hectares.

The famous machine operators N. Manukovskiy and A. Gitalov have attained great successes in mechanizing the raising of corn and other crops.

Machine operators N. Filippov and I. Myagkikh of the Stalin Collective Farm Minusinskiy Rayon, Krasnodar Kray, competing with Manukovskiy, raised in 1959 over 600 centners of green corn fodder per hectare on an area of 153 hectares without the use of manual labor. Such examples are numerous.

Raising the quality of agricultural work and applying scientific principles of agriculture are of special significance in assuring high yields and steady harvests.

The main links of a scientific system of agriculture are economically determined grain-crop, vegetable, fodder-crop, and meadow-pasture crop rotations; the necessary methods of cultivation, fertilization, seed selection, sowing and harvesting; the struggle against erosion, plant diseases, and agricultural pests.

The most important link in the agricultural system -- the crop-rotation system -- determines the structure of the sown area and such alternation of crops as creates the best conditions for the growth of crops. Unfortunately, in the past this very important prerequisite for a good crop-rotation system has not been observed. It is well known what harm was done to agriculture by the stereotyped application of the grass-crop rotation system.

Crop rotation is not an aim in itself, but an important means of raising the yields and gross harvests of agricultural crops, lowering the cost of production, and raising soil fertility. If changes in the rotation of crops and the structure of the sown area attain these ends, crop rotation is then not only possible but essential.

An important resource for increasing the gross grain harvest on every farm is the preferential raising of such crops as are the most productive and economically advantageous under the local conditions.

No other grain crop can rival corn in yield. The December Plenum gave a great deal of attention to the question of improving the structure of the sown area and increasing corn production as important prerequisites for premature fulfillment of the Seven-Year plan. In the Russian Federation it is planned to enlarge the area sown with corn to 20,000,000 hectares as against 10,400,000 in 1958. Expansion of corn sowing in the republic will be achieved mainly through the reduction of the sown area of less productive crops. In 1964, in the RSFSR, corn will occupy about 25% of the grain area; on collective and state farms in the southern regions of the RSFSR this proportion will be nearly one half. The production of corn as a grain crop will be 600 to 700 million poods higher than in 1958. In the Ukraine it is planned to put 9 to 10 million hectares under corn, or over 50% of the grain area, producing 60% of the gross grain harvest.

In Kazakhstan the area sown with corn will be sharply expanded: in 1962 it will occupy 4,500,000 hectares, or 3.2 times more than in 1959. In Byelorussia it is planned to put 500,000 hectares under corn in 1960, or twice as much as in 1959. This will comprise about 20% of the area sown with grain on the collective and state farms of the republic.

Together with a rise in the proportion of corn in the crop-rotation system, another important resource in increasing the production of this crop is the wide introduction of second sowings. Existing data indicate that second sowings can be carried out on 1,500,000 hectares in the Russian Federation and on 3,000,000 hectares in the Ukraine.

In this respect Krasnodar Kray has acquired rich experience: here the area under second sowings has already reached 350,000-400,000 hectares. As a result, the collective and state farms receive an additional 300,000-350,000 tons of corn ears in a milky-waxen stage of maturity and over a million extra tons of green fodder. Similar experiences have been accumulated in Stavropol' Kray and in many other regions.

A great expansion in the area sown with corn has become possible because the full mechanization of corn raising under the square cluster system has been established, the mass production of high-yielding hybrid seed has been organized, and improved chemical methods of fighting weeds have been worked out.

The USSR now occupies first place in the world in the production of wheat. A great deal of attention will be given to increasing the gross harvests of this crop. Of special importance is the expansion in the production of hard and strong varieties of wheat in Siberia, the Volga region, and other regions with favorable conditions.

During the next few years in Kazakhstan the proportion of hard wheats will rise to 35-40%. The area sown with strong wheats will be expanded in several regions in the Ukraine and the Northern Caucasus. A vital matter in raising the yield of hard and strong wheats is the production of new selected seeds and sowing on the most favorable land. In order to interest collective and state farms in increasing the production of hard and strong wheats, their price has been set 40% higher than ordinary soft wheat.

It is planned to expand the area and increase the yield of groats and especially buckwheat and millet. In Kazakhstan alone it is proposed to put over a million hectares under millet in the next few years.

In the Ukraine, the central regions of the non-chernozem zone, the central chernozem regions, and in several areas of the Volga region, leguminous crops will be expanded, including peas, which produces a high yield here. As well as having high nutritional and fodder qualities, leguminous crops enrich the soil with nitrogen and prepare it for the sowing of succeeding crops, including grain.

Calculations indicate that as a result solely of improving the structure of the sown area over 600,000,000 poods of additional grain and a large increment of fodder can be produced annually.

Vital resources for raising yields are the application of organic, mineral, green-manure, and bacterial fertilizers; the liming of acid soils, applying gypsum to saliferous soils; intensification of the struggle against the pests and diseases of agricultural crops; and the use of other advanced agrotechnical measures. This especially applies to the central and northwest regions of the Soviet Union, where, in spite of favorable climatic conditions, many collective and state farms obtain low grain yields because of poor agricultural practices and, especially, insufficient use of fertilizers.

Wide-scale application of organic and mineral fertilizers in the non-chernozem belt of the RSFSR and in the Ukraine, Byelorussia, Lithuania, Latvia, and Estonia would significantly increase grain yields and completely satisfy the needs of the collective and state farms for grain, especially feed grain.

Now that the number of livestock has grown and conditions for raising them have improved, the collective and state farms have their own equipment, it is possible to accumulate and spread on grain fields hundreds of millions of tons of manure, peat, and other organic components mixed in the proper proportions with lime, phosphorite, and other mineral fertilizers. Manure-earth compost, recommended by academician T. D. Lysenko, should be widely applied as fertilizer.

Every collective and state farm should set up its own fertilizer plant, construct storage facilities for dung and liquid manure, and organize the compost mixing of peat and other organic waste. The more organic fertilizer applied, the higher the yields.

Occuping a central position among measures for raising yields is conversion to the mass sowing of selected seed. It cannot be considered normal that up to now nearly a third of the spring grain crop has been sown with ordinary seed, and in large areas even with unconditioned seed. It has been calculated that as a result of the complete conversion to the sowing of selected seed, collective and state farms should produce an additional 600 to 700 million poods of grain a year.

The time has come for a definite improvement of seed production, re-examination of the existing system of seed raising, elimination of the numerous work steps involved and radical reduction of the expenses incurred by the state, collective farms, and state farms for the transportation of large quantities of seed. Experience in organizing the production of hybrid corn seed demonstrates that the problems of seed raising can be resolved in the Soviet Union in a short time.

An important method of increasing gross grain yields and reducing harvest losses is the two-stage system of harvesting grain. This also assures preservation of the quality of grain and makes possible the hauling of grain directly from the combine to the procurement center.

Successful resolution of the tasks set forth by the XXI Party Congress and the December 1958 and 1959 Plenums of the Central Committee for the development of agriculture is closely related to continuous technical progress in mechanization and electrification, and to speeding up the equipment of collective and state farms with new machinery for the full mechanization of work.

An important trend in the mechanization of agriculture in the near future, as pointed out in the resolutions of the Plenum, is transition to a higher operating speed of tractors and other agricultural machinery and equipment, and the providing of collective and state farms with machinery for all work processes which generally lag as regards full mechanization, including grain raising. Accordingly, the Gosplan of the USSR is required by the decisions of the Plenum to arrange for the production and supply to agriculture of tractors, machinery, and equipment on a scale which will make possible the full mechanization of all branches of agriculture on the basis of technological charts scheduling spring sowing in 5 to 6 days and grain harvesting in 10 to 12 working days.

Equipping agriculture with a large quantity of new, improved tractors, combines, drills, cultivators, and other machines will, if these machines are correctly utilized, greatly shorten the periods of field work.

Assuming that the completion of field work in shorter agrotechnical periods will result in at least an extra centner of grain per hectare, then for the country as a whole the increment of grain will be 700 to 800 million poods a year.

A great deal of work confronts the virgin-land areas in establishing advanced systems of agricultural management, improving the supply of machinery, and improving the utilization of machine technology.

The noteworthy and patriotic initiative of the collective farmers of the Lenin Agricultural Artel, Izyaslavskiy Rayon, Khmel'nitskiy Oblast, deserves every kind of support. The members of this artel', after discussing the resolutions of the December 1959 Plenum on the further development of agriculture, decided to give the virgin-land regions skilled assistance. They pledged to send beforehand to any designated farm the number of collective farmers necessary for the uninterrupted operation of 10 combines. With their aid the farm prepare in advance for harvesting and will complete the harvest in a shorter period with a view to

avoiding losses in the rich virgin-land harvest. The initiative of the collective farmers of the Lenin Artel is being widely followed in the collective farm village.

Besides increasing the production of grain, it is very important to lower the cost of labor and capital per unit of produce, to lower the cost of grain production. This may be achieved through the correct organization of work in grain raising and by means of technological charts indicating in rational succession all the operations to be carried out with correctly chosen and complementary machinery and equipment.

Calculatinns prepared by the Ministry of Agriculture USSR and based on model technological charts show that labor costs in man-hours in raising and harvesting grain (including the harvesting of straw) are as follows in the most characteristic agricultural znnes:

	Per Hectare		Per Ton of Grain	
	With existing technology	With new technology	With existing technology	With new technology
Southern steppe zone	16.5	11.1	4.2	2.0
Western Siberia and Northern Kazakhstan	15.6	11.11	5.7	2.9
Central non-chernozem zone	86.9	45.0	29.3	14.5

Calculations show that after the introduction of advanced technology in the raising and harvesting of grain, the cost of labor in producing grain can be reduced by 1½ to 2 times, and in the raising and harvesting of corn by 3 to 4 times.

In accordance with the resolutions of the December Plenum, every rayon, collective farm, and state farm is devising measures for the fulfillment of the goals of the Seven-Year Plan ahead of time. A very important stage in this endeavor is the implementation of measures to fulfill and overfulfill the goals for 1960, the second year of the Seven-Year Plan.

The national economic plan provides for a gross grain harvest of 9,300,000,000 poods this year. In order to attain this goal, local Party, soviet, and agricultural organs and managers and specialists on collective and state farms must do everything possible this year to improve agricultural practices, to do quality work at the proper time,

and to increase the accumulation and use of organic fertilizer. A harvest of 9,300,000,000 poods of grain in 1960 is a promising basis for fulfillment of the Seven-Year Plan ahead of time in all branches of agriculture.

III. THE MOST IMPORTANT PROBLEMS OF COTTON PRODUCTION IN THE USSR

/Following is a translation of an article by A. D. Dadabayev, Vice President of the Uzbek Academy of Agricultural Sciences, in the Russian-language periodical Vestnik sel'skokhozyaystvennoy nauki (Review of Agricultural Science), Moscow, Vol. 5., No. 1, 1960, pages 23-27./

Soviet agricultural scientific-research institutions have made large contributions to the solution of the problem of strengthening and developing cotton production in the USSR. The progressive methods of raising cotton developed by these institutes, and the productive varieties of cotton created by seed-selection workers, have found broad application in production. This has contributed to a sharp increase in the Soviet cotton harvest, a rise in the quality of cotton, and a reduction in costs of production.

In the last few years alone, following the conversion to the square-cluster method of sowing cotton, scientific institutes have developed and refined a system of agrotechnical measures, including methods of mechanization, fertilization, irrigation, etc. On this foundation, principles were drawn up for cotton cultivation eliminating hoeing operations. With this method of cultivation the yield of cotton increases from 1 to 6.5 centners per hectare, and the labor costs of the cultivation of one hectare are reduced by more than 2 times. The new agrotechnical methods recommended by the scientific institutes have been widely applied in production, for example, the introduction of phosphorus fertilizer during sowing, which raises the yield of cotton by 2-2.5 centners a hectare. Early fertilization of cotton is practiced everywhere, making for better growth and development and the improvement of ripening; also universal is irrigation between rows, resulting in the thorough penetration of water. Cotton-alfalfa crop-rotation systems have been developed for different natural-economic zones, in particular, the system of the mixed sowing of corn and shaftal clover (trifolium resupinatum) in alfalfa fields. Under wide application and being thoroughly studied at present are chemical preparations (mercaptophos and others) inducing internal reactions against cobweb ticks (tetranychus urticae Koch) and other suctorial cotton pests, since the labor and capital costs of combatting pests with these chemicals have been reduced 3 times.

Among the varieties of cotton developed in the last few years and notable for fast maturation, high yield, wilt-resistance, and good-quality-fiber are KK-1083, KK-1543, S-1543, S-3381, K-1893, and S-3445. These varieties ripen 15 to 20 days sooner than the 108-f

variety. The varieties 2421, 2173, S-4727, S-8330, and KK-1056 ripen 5 to 10 days sooner than 108-f. The varieties 315-2, 150-f, S-1579, S-1622, S-1581, S-1944, and S-8201-532 approach 108-f in speed of maturation, but have a higher yield. Cotton varieties have been developed with a fiber length of 34-36 mm (S-9018, S-8202, S-5497, 149-f ZR-7, S-1835, Gissar-1, Gissar-3, and K-5169); varieties of the melange-production type with a fiber yield of 40-42% (S-1944, S-1759, and 152-f); a gymnospermous variety, 153-f; fine-fibered varieties (S-6002, S-8017, S-6022, 9123-I, 9041-I, 8981-I, 5595-V, 5230-V, and 8763-I). During the last few years the following varieties have also been adapted to various regions and introduced into production: KK-1543, KK-1083, K-1893, 2421, 2173, 8763-I, S-6002, and others of induced multiplication.

A system of land reclamation, and forms and methods of drainage designed to radically improve saline and swampy soils, have been developed. A new method of draining saline soils by drilling wells for vertical drainage and using ground waters for irrigation has yielded very good results. The introduction of this method leads to a radical improvement in land reclamation. This method should also become an important supplementary means of irrigation, especially in regions where ground waters occur close to the surface and have sluggish runoff. Extensive production tests have confirmed the efficacy of irrigating cotton and grass by the sprinkling method.

A system of antifiltration methods has been developed which significantly raises the coefficient of the effective utilization of irrigation waters. Highly efficient pumping stations have been constructed which make possible great deal of work on automatization and remote control in the irrigation system. The construction of hydrotechnical structures using concrete and ferroconcrete components has been studied and recommended.

Double-level plowing with the introduction of fertilizer between layers has been proposed and put into practice. This raised cotton yields on old lands by 1.5 to 2 centners a hectare and alfalfa yields by 2.5 to 4 centners a hectare. A prospective system of machinery has been developed for the full mechanization of cotton growing. The design and dimensions were worked out for the NKU-2.8 mounted cultivator, which has been extensively used in all cotton-growing regions. The mass production of new, improved types of cultivators--NKU-2.4, 2.7, and 4.6, and the PR-5 leveler, has been organized.

However, the work of scientific-research institutes dedicated to cotton raising has serious deficiencies. In 1955-1956, the reorganization of the network of scientific-research institutes had a definite influence on their activity, but it weakened the centralized control of scientific work and the methodology and coordination of scientific research. The work of coordinating councils has not yet gotten underway.

Problems of the full mechanization of cotton raising receive insufficient study, and practically no solutions have been found for the mechanization of such labor-consuming processes as irrigating operations; the mass application of organic-mineral fertilizers; hauling, loading, and unloading work; and a number of harvesting processes. Chemical methods of fighting weeds and a method of applying liquid fertilizer have not been developed, and a system for sowing a given quantity of seed in a cluster has not been determined.

Seed-selection work also lags seriously behind demand. Changes in seed varieties have not taken place for many years, and in productive work varieties answering the requirements of rapid maturation, wilt resistance, technical quality, zonal adaptability, and amenability to mechanized harvesting are lacking.

In scientific work the latest method of research, including the use of isotopes, and the latest equipment and instruments are not being adequately utilized. The level of scientific research is low in regard to several important questions, such as boll formation, the principles of plant nutrition, genetics and mutations, and controlled propagation.

Little work has been done in analyzing and putting into practice scientific achievements and the advanced experience of collective and state farms and of foreign countries.

The material, technical, and scientific base of many scientific research institutes is inadequate to the research needs and tasks confronting agricultural science. At present the areas of the scientific-research institutes do not generally equal those of average collective or state farms. This hinders the conduct of research on the necessary scale under conditions resembling those of the actual practice.

The goals of the Seven-Year Plan brook no delay in the elimination of the deficiencies in the work of scientific institutes.

At present the amount of cotton produced per cotton worker in the USSR averages 2.5 to 3 tons. At the same time, in brigades where there is full mechanization of cotton raising organized on the initiative of production innovators V. Tyupko, T. Abdamatov, and others, the production of cotton per worker reaches 8 to 10 tons.

Delay in fall plowing has negative effects on cotton yields. With fall plowing, the cotton yield is raised by 3 to 6 centners per hectare in comparison with spring plowing. Fall plowing also leads to a more even utilization of the tractor pool and a better organization of sowing work. The insufficiently broad application of fall plowing is due to delays in harvesting.

The low cotton yields on saline soils with shallow ground water are largely explained by the fact that complex reclamation measures, including the construction of drainage systems, land leveling, and irrigation, are not adequately applied. A steady rise in yields, a lowering of the cost of production, and rational combination of the branches of production depend primarily on correct crop rotations in the cotton-growing regions. Crop-rotation systems are being organized slowly, mainly because of the slow tempo in bringing new land into the rotation system on a scale sufficient for the sowing of grass and cotton.

Since the principal cotton-raising regions in the USSR lie further north than in the rest of the world, fast maturation is a problem of special importance.

During the past few years, because of the absence of correct crop-rotation systems and sowing the same land with cotton without rotation for several years, there has been much cotton wilt, which has resulted in a great reduction in yield and assumed threatening proportions. Conversion to a system of cultivation eliminating hoeing operations is hindered by lack of the necessary quantity of effective weed killers and special machinery for applying them. In the cotton-growing regions there has been a lag in the development of the soil-improvement and agro-chemical facilities important for the correct solution of organizational, agrotechnical, and other agricultural problems.

In the Seven-Year Plan a further increase in cotton production is foreseen for the period 1959-1965, mainly through increased yields. The decree of the Central Committee and the Council of Ministers USSR on measures for the full mechanization of cotton growing determines the main direction as regards solution of the problem of increasing cotton production and sets forth the level of the mechanization of cotton growing for each year. By 1965 it is planned to complete, in the main, the mechanization of the raising and harvesting of cotton.

New forms of the organization of production--tractor-field brigades aided by full mechanization--play an important role in mechanizing cotton raising. In 1957 there were only three such brigades in Uzbekistan, directed by Valentin Tyupko, Togay Absamatov, and Kurban Kenzhayev. In 1958 there were 1,600 of these brigades in the republic, and in 1959, 5,000.

In 1959 cotton cultivation without hand hoeing covered an area of 500,000 hectares, or nearly 40% of the sown area of the republic.

The efforts of scientific workers regarding mechanization should be directed toward the improvement of machinery systems for the full mechanization of cotton raising in accordance with the zonal characteristics of the cotton-growing regions. Collective and state farms require assistance in carrying out the nonhoeing method of cultivation.

The establishment of cotton-alfalfa rotations should play an important role in the further development of cotton raising. The law enacted by the Presidium of the Supreme Soviet of the Uzbek SSR on the organization of crop rotations, on the collective farms and state farms of the Uzbek SSR, and similar measures in other cotton-raising republics have laid down the principle of the wide application of this important method. Scientific institutes should continue research on developing more effective and economical principles of crop rotation for the different cotton-growing zones. It is also important to improve in every way the agrotechnology of cotton raising in accordance with the crop-rotation systems to be introduced, and to develop better harvesting machinery and techniques. Special attention should be given to searching for radical ways of fighting vetticillios and fusarium wilt.

The scientific institutes should develop methods of determining the requirements of cotton for nutrients and water, and methods of accelerating the sprouting of cotton seeds proper preparation of seed and soil). It is necessary to expand research on improvement of the basic cultivation of the soil on the basis of deep plowing (with and without moldboards), drawing upon irrigation reserves. Scientists should seek out better methods of testing, selecting and standardizing cotton seed on the basis of requirements for a given quantity of seed per hole. They should look for ways and means of raising the efficacy of mineral fertilizers in crop rotations by means of improved agricultural practices and the correct use of growth agents; microelements; and bacterial, green, and local fertilizers.

Scientific institutes should give assistance to construction and planning organizations and also to collective and state farms on reclamation and irrigation matters. It is necessary to accelerate the development of a system of measures for the full mechanization of irrigation, reclamation, and hydrotechnical work, and the development of new methods of mechanizing and automatizing irrigation with a view to sharply reducing the cost of manual labor.

Special attention should be given to the development of more effective drainage measures, the creation of a collector drainage system for different reclamation conditions, and the development of effective antifiltration facilities to combat water losses, silting, and stoppage of canals. In addition, it is necessary to intensify work on improving

the designs of hydrotechnical structures and improving their facilities for in holding, regulating, and distributing water. Research must be extended in utilizing local materials in irrigation construction.

In the development of improved varieties of cotton and the application of them in production, we have found a positive solution to one of the fundamental problems of cotton growing. However, seed raising and selection work still suffer from insufficient attention.

In the last few years the results of the activities of scientific institutes have been investigated. The introduction of valuable scientific findings in production has been carried out slowly. In this connection one must note the poor work of design bureaus and industrial enterprises in preparing new models of machinery, parts, and apparatus. Up to now, the proposals regarding a system of antifiltration methods have not been put into practice, as a result of which the intolerably low coefficient of the effectiveness of irrigation waters persists.

On individual collective and state farms there have been gross violations of the principles of agrotechnology in presowing cultivation, the watering period, fertilization, and the organization of harvesting, which has led to lowered cotton quality, great losses, and underfulfillment of work norms in irrigation and fall plowing.

It is obvious that in order to resolve the tasks set forth in the resolution of the Plenum, adopted 25 December 1959, on the further development of agriculture, scientific-research institutes must eliminate the factors holding back progress in cotton raising and secure wide application of scientific achievements and advanced experience.

IV. METHODS OF INCREASING LABOR PRODUCTIVITY IN FLAX GROWING

/Following is a translation of an article by M. Kozlov, candidate in economic sciences, in the Russian-language periodical Ekonomika sel'skogo khosyaystva (Argicultural Economics), Moscow, Vol. XXXI, No. 3, March 1960, pages 37-44./

Fiber flax is one of the most important industrial crops in the Soviet Union and is of great significance in the national economy. In the production of flax fiber the Soviet Union holds first place in the world. In 1958 it accounted for 66.2% of the world production of flax fiber.

In most of the non-chernozem zone, flax is one of the leading commercial crops. The money received from flax sales makes up, on the average, 60 to 70% of the monetary income of the collective farms conducting flax husbandry.

The area sown with fiber flax and the gross flax harvest have increased greatly since the Great Patriotic War. At the same time, the number of workers of flax-raising collective farms has sharply decreased. On the average, a worker in the main flax-raising regions in 1956 raised flax on an area 7 to 8 times as large as in 1925 and 2 times as large as in 1940. In the RSFSR in 1958 the average direct labor expenditure per hectare of land under fiber flax was 69 man-days. But these data give only a hint of the changes in labor productivity in flax raising. A more accurate indication of the growth in labor productivity is the reduction of the labor expenditure per unit of output or the increase in the quantity of product per unit of time.

In examining the problem of labor productivity in the raising of a crop, calculations are made with natural indexes.

There are certain peculiarities in the method of calculating labor productivity in flax raising. Flax-growing collective farms sell fiber products to the state in different forms (straw, tow, raw flax, fiber). Consequently, the question arises as to which type of product labor expenditure should be applied. In some cases, in the determination of labor productivity, labor expenditures are calculated not by the direct product produced on the collective farm, but by the end product --fiber. For example, if the entire output of a collective farm is sold in the form of straw or tow, the labor expenditure is calculated by fiber. In calculating by this means, the straw or tow is converted into fiber by the relevant formulas, and in this way flax products are reckoned as fiber, on which the labor expenditures are based. This

This method of determining labor productivity for a collective farm is not entirely correct. In order to obtain this quantity of fiber it is necessary to expend an additionally determined amount of labor. Consequently, the labor productivity after calculating these expenditures will be different. In order to determine labor productivity, calculations must be made on the basis of the product obtained on a given farm: in the form of tow, straw, or fiber. If a collective fiber, labor productivity must be reckoned on each type of product separately.

In flax raising, labor is expended on the production of both seed and fiber products. The calculation of labor expenditure on collective farms is based on the whole crop.

In calculating labor productivity in flax raising it is necessary and correct to take the expenditures on the combined product, seed and fiber. Some economists propose basing expenditures on the combined product, as well as on both seed and fiber according to the indexes of value. For this, all expenditures, including labor, are based on the combined product in proportion to the monetary income received for different types of flax products. However, this method of calculating the labor expenditure practice shows, does not reflect the real expenditure on the combined product on collective farms and in brigades.

In calculating the labor expenditure on the combined product on collective farms it is best to make use of the correlation of the direct labor expenditure on individual types of combined products. For this, according to the given accounting on the collective farm, all labor expenditures in flax raising before the harvest are applied equally to seed and fiber product, since expenditures at any stage of this work necessarily apply to each product equally (seed and fiber). An exception is seed production, in which certain work in tending seed plots has a unique agrotechnical character (hoeing between rows and selective weeding). Labor expenditures on the latter type of work must be applied only to seed. Al subsequent labor expenditures must be related to that product with whose production they are connected.

Thus, labor expenditures in threshing after harvesting with flax-pulling machines or by hand are applied in equal measure to seed and fiber product. Expenditures in threshing flax heads with flax combines and in seed sorting are assigned to seed only. All labor expenditures in primary flax processing (spreading straw on retting fields, or retting; removing tow from the retting field or water-retting tanks; beating and processing tow) should be applied only to the fiber product.

It is necessary to relate brigade general-production and general-economic expenditures of labor to the obtained percentile correlation of the direct expenditures of labor on individual combined products.

This method, as shown by calculations worked out on the collective farms of the Smolensk and Kalinin oblasts, gives a more accurate picture than value indices of the special character of flax production in accordance with the level of mechanization of individual tasks and method of the primary processing of flax. The correlation of expenditures on combined products substantially differs not only from year to year, but also on the different collective farms and in the different brigades.

In calculating labor productivity in flax raising, the labor expenditure and flax production of a certain year must be carefully taken into account, taking into consideration that on different collective farms part of the harvest of the current year is processed in the following year. For example, on the Gor'kiy Collective Farm (Yel'ninskiy Rayon, Smolensk Oblast), 96.6% of the flax harvested in 1956 was processed in 1957, and 85.3% of the flax harvested in 1957 was processed in 1958. The labor expenditures in processing flax products in 1957 from the 1956 harvest was 28% of the total expenditure on flax production for that year; for processing the products from the 1957 harvest in 1958 the corresponding figure was 25%.

Calculation of the labor productivity of collective farms in fiber product is more accurate if the quality of the product is taken into account, that is, if the labor expended is related to the production calculated in centner units. As an illustration let us take the following example. In 1958, the expenditure on one centner of flax fiber in Yaroslav Oblast was 17.5 man-days and in Moscow Oblast 17.2 man-days. Thus the labor productivity in flax raising in these oblasts seemed to be equal. But in Yaroslav Oblast flax fiber was given the unit designation 9.26 and in Moscow Oblast the unit designation 5.55. If the expenditure is computed in centner-units, then the labor productivity in Yaroslav Oblast is 64% greater than in Moscow Oblast.

Quality is taken into account in purchasing flax products (fiber, tow) from collective farms. The quantity and quality of the manufactured linen are directly dependent on the quality of the flax fiber. Collective farms must expend additional labor in order to obtain high-quality flax fiber, and if the quality of the product is not taken into account, the true level of labor productivity in flax raising is grossly distorted.

The average level of labor productivity in flax raising for 1956-1958 is represented below by various union republics:

	Direct expenditures (in man-days)*				
	per hectare	per centner of flax fiber	per centner-unit of flax fiber	per centner of flaxseed	Proportion of factory processing of tow
USSR	88.6	25.8	3.5	14.7	63.8
RSFSR	64.4	19.2	2.6	15.8	79.9
Byelorussian SSR	145.7	36.1	4.7	17.9	50.1
Ukrainian SSR	136.6	35.0	4.4	12.4	20.0
Lithuanian SSR	61.1	21.3	3.6	10.4	68.9
Latvian SSR	87.5	21.8	3.1	21.6	77.1
Estonian SSR	55.8	11.7	1.5	26.8	91.7

*Calculated by converting the expenditure in labor-days into man-days according to the coefficients of the Central Statistical Administration USSR.

Labor productivity calculated by centner and centner-unit is highest in Estonia and the Russian Federation and lowest in Byelorussia. The differences in labor productivity between the republics are considerable. In the Estonian SSR, labor productivity is over 3 times higher than in the Byelorussian SSR. Differences in the proportion of the factory processing of flax have an important bearing on the level of labor productivity. Attention should also be directed to the sharp variation in the level of labor expenditure per hectare of flax area. In this connection, a lower labor expenditure per hectare does not always indicate a lower expenditure per unit of production. Thus, in Lithuania the labor expenditure per hectare is lower than in the Russian Federation. However, the labor expenditure per centner of flax fiber is 11% higher in Lithuania than in the RSFSR, and labor expenditure per centner unit 38% higher. The higher average labor expenditures per hectare on the collective farms of the Russian Federation are compensated by higher yields and better-quality flax.

The highest labor productivity in the flax-growing regions of the non-chernozem zone is found in the Kalinin and Yaroslav Oblast. During 1956-1958 the average expenditure per centner of flax fiber in Kalinin Oblast was 16.8 man-days, and per centner-unit, 2.5 man-days. In Yaroslav Oblast the corresponding figures were 16.3 and 1.8.

The labor expended on each flax product varies in the different republics. This is explained primarily by differences in the yields of seed and fiber product and the relative quantity of these products. A influence on the correlation of expenditures on seed and fiber is exerted by the level of the mechanization of individual jobs and especially by the proportion of flax fiber processed in factories.

Raising labor productivity in flax raising can be achieved in two ways: by cutting down labor expenditures per unit of area (in the final analysis, per unit of production), and by increasing yields.

The most labor-consuming tasks in flax raising are harvesting, threshing, and primary processing. According to the data of different collective farms in the Kalinin and Smolensk Oblasts, these operations account for 70 to 85% of all expenditures in flax raising and production. Consequently, lowering labor expenditures in this work through mechanization represents one of the most important resources for raising labor productivity in flax growing.

Harvesting flax on collective farms takes 10 to 13 man-days per hectare. However, the level of mechanization in flax harvesting is entirely inadequate.

In harvesting operations with the existing flax-pulling machines, labor expenditres are reduced by 2 to 2.5 times in comparison with hand harvesting. The use of flax-pulling machines with binding equipment cuts down labor expenditures by approximately 2 to 3 times in comparison with the use of the existing flax-pulling machines.

The labor expended in threshing flax is at present approximately the same as in harvesting. The level of the mechanization of flax threshing with the efficient MLS-2.5 flax threshers is still low on flax-raising collective farms, because the supply of these machines is inadequate and they are not being fully used. For example, in Kalinin Oblast in 1957, only 51% of the flax harvest was threshed with MLS-2.5 threshers, nearly half of the crop being harvested with inefficient "Eddy" threshers and even more primitive equipment.

In order to reduce labor expenditures in flax threshing it is necessary, besides raising the efficiency of the MLS-2.5 thresher, to design improved more efficient flax threshers which will sharply reduce waste in the form of tangled flax and will handle crops in the presence of diverse moisture conditions.

Flax tow is generally processed by spreading flax straw by hand on retting fields or soaking it in natural bodies of water. The labor expenditure in spreading straw and removing tow from retting fields in a harvest of 15-18 centners per hectare is 13 to 15 man-days per hectare. By this means the time required to process tow (spreading and soaking) and the quality of the fiber depend entirely on weather

conditions. The best period for flax spreading in the flax-raising regions of the non-chernozem zone is August and early September--the busiest months of the harvesting season. Consequently, on many collective farms spreading is done during later less favorable periods, and sometimes in winter in the presence of snow, which increases expenditures by approximately 2 times and lowers the quality of the fiber.

In order to reduce labor expenditures on collective farms in processing tow, reduce losses, and raise the quality of fiber, it is necessary to make a rapid transition to industrial methods of processing flax tow. This would eliminate the adverse influence of weather conditions throughout the year in processing flax fiber. Transition to industrial methods is also dictated by the fact that in several regions of intensive flax culture there is already a sharp insufficiency of spreading area, and this insufficiency will become even more pronounced in the future after the expansion of flax growing and the reduction of the number of idle and fallow lands which will be plowed up and subjected to crop rotations.

Thus, according to data of the Likhoslavl'skiy Flax Plant in Kalinin Oblast, in 1958 the processing of a ton of flax by warm soaking entailed a labor expenditure of 39 hours. As a result, labor expenditure per hectare in harvesting 15 centners of flax, or about 4 centners of flax fiber per hectare, is 7 to 8 man-days by the warm soaking method, that is, approximately twice as low as by spreading the straw. It should be noted that about 40% of total labor expenditure in warm soaking goes for drying the soaked flax. Minimizing labor expenditures in drying soaked flax by means of improved methods is one of the main resources for reducing labor expenditure in the warm soaking of flax straw. In order to solve this very important problem, the setting up of warm-soaking shops in flax plants should be accelerated, and special attention should be given to the construction of collective farm or inter-collective farm warm-soaking plants.

Scientific institutes and design bureaus are confronted by the task of immediately preparing model blueprints of plants and more efficient industrial methods of processing flax in order to gradually resolve this fundamental problem flax production.

Another labor-consuming task in flax production is the separation of fiber. Labor expenditure in processing flax on collective farms with the TL-40 flax-processing equipment constitutes over 50% of all expenditures on flax fiber. These expenditures are much lower in flax-processing plants. For example, on the Kuybyshev Collective Farm, (Krasnokholmskiy Rayon, Kalinin Oblast), 5.7 man-days were expended to obtain a centner of fiber in 1958, but in the Bortnitskiy Flax Plant, which services this collective farm, the expenditure amounted to

only 3.1 man-days. On the "Russian" Collective Farm (Bezhetskiy Rayon) the expenditure amounted to 11.2 man-days, and in the Bezhetskiy Flax Plant, 3.4 man-days.

However, the capacity of the existing flax plants in the various oblasts and rayons is not being fully exploited because of the lack of raw material. Thus, according to data of the Administration for the Procurement and Primary Processing of Flax of the Kalinin Sovnarkhoz in 1959 the idle time in flax plants due to lack of raw material amounted to approximately 8,000 machine shifts. Providing these machine shifts with raw material would make it possible to process 11,429 tons of flax products, raise labor productivity, and lower the cost of producing flax fiber. Tentative calculations of the Kalinin Sovnarkhoz show that the costs of maintaining equipment in flax plants during standstills are 6 to 7 million rubles. At the same time, the collective farms of the oblast received 600 flax-processing machines costing 1,500,000 rubles.

The problem of the correct combination of flax processing outside the factory with flax-processing machines, and factory processing is an extremely important one. Flax processing should be organized in such a way that most of the fiber processing is done in factories receiving enough raw material for the year-round utilization of existing equipment.

In regions where factories are not able to process all the flax, as well as in regions with small areas, sown with flax and on collective farms located far from factories, it is more advantageous to set up flax-scutching centers and construct collective-farm or inter-collective farm flax factories for primary processing.

In order to improve the work of flax plants, expand the production of flax fiber, raise its quality, increase labor productivity, and lower the cost of production, the plants constructed in 1931-1932 should be redesigned and their obsolete equipment should be replaced. The plants should be connected to high-voltage power lines. Loading and unloading and other types of manual labor should be mechanized. Existing flax-scutching centers should be re-equipped and new ones built according to standard plans.

A comparatively high proportion of pre-harvesting work (8-9%) consists in tending the sown flax (weeding and fertilizing). Effective use of chemicals to control weeds will in the next few years reduce the labor expended in hand weeding by 5 to 6 times.

Up to now, the preparation of local fertilizer (peat, lime, etc.) and its application have scarcely been mechanized at all. A great saving in labor expenditure and time can be effected by the aerial application of mineral fertilizers.

Attention must be given to the mechanization of interrow hoeing in thinning seed plots, which accounts for 9 to 10% of all expenditures in raising flax.

An effective resource for reducing labor expenditure in flax growing is decreasing indirect expenditures (brigade, general-production, and general-economic expenditures) which constitute 20 to 30% of all expenditures in flax raising. On many collective farms there is no planning as regards indirect labor expenditures on individual jobs, and where such planning is carried out there is scarcely any control of plan fulfillment during the year. The experience of advanced collective farms shows that planning as regards indirect labor expenditures on individual jobs within the brigades, and strict control of their fulfillment during the course of the year intensify the struggle of the kolkhozniks for economy in labor expenditure. Collective farms should conduct a systematic re-examination of work norms.

The level of labor productivity in flax raising is directly dependent on yield. This is indicated by the following data from the collective farms of Bezhetskiy Rayon, Kalinin Oblast, in 1958:

Collective farms ranked by yield of flax fiber (centners/hectare)	Number of collective farms in group	per hectare	per centner of fiber
Under 4	18	87.1	17.9
4.1-5	11	93.7	13.8
5.1-6	18	95.5	12.1
Over 6	8	111.4	11.5
Total in rayon	55	95.1	12.4

Collective farms ranked by yield of flax fiber (centners/hectare)	Proportion of non-factory processing of flax (%)	Monetary income (rubles) per hectare	Monetary income (rubles) per man-day
Under 4	29.8	5636	64.6
4.1-5	13.7	6664	71.2
5.1-6	21.3	9242	96.8
Over 6	47.8	14972	134.4
Total in rayon	27.7	8559	90.0

With an increase in the yield of flax fiber per hectare on collective farms, the labor productivity and monetary income per hectare and man-day also grow. Labor productivity in the group of farms producing over 6 centners per hectare was more than 35% higher than in the lowest group.

Direct labor expenditures per hectare, on the contrary, are higher on collective farms that obtain higher yields of falx fiber. In the fourth group, for example, the direct expenditures in man-days per hectare were 27.9% higher than in the first group. However, the additional labor expenditures related to higher agricultural yields are compensated by a greater fiber harvest per unit of land. This is confirmed by the fact that the group of farms with higher yields also had higher labor productivity and monetary income per hectare and man-day.

Conformity to these results was also apparent in all the economic indexes based on the groups of collective farms of the Krasnokholmskiy and Rzhevskiy rayons of Kalinin Oblast.

In flax production, as with other crops, yield depends on the level of agricultural technology. This is confirmed by data for 1953 on the rayons and collective farms of Kalinin Oblast; these are presented in the table below:

	Area sown with Flax after clover (%)	Fertilizer applied per hectare (centners)			Flax sown (%)	
		Mineral (industrial	Local (ashes, chicken dung)	After fal. plowing	Before 20 May	
Average for the oblast	76.1*	1.70	no data	56.3	92.6	
		Bezhetskiy Rayon				
Average for the rayon	97.9	3.20	0.09	97.4	92.1	
"Russia" Collective Farm	100.0	0.92	0.34	100.0	97.3	
		Krasnokholmskiy Rayon				
Average for the rayon	99.0	2.30	0.50	95.0	94.3	
Kuybyshev Collective Farm	100.0	2.28	0.97	100.0	93.1	

	Flax pulled before 1 September (%)	Straw spread in August and September (%)	Harvest of flax fiber (centner/ hectare)	Direct expenditure per centner of flax product (man-days)	Proportion of flax fiber processed on collective farms (%)
Average for the oblast	59.2	85.0	3.2	19.6	29.1
		Bezhetskiy Rayon			
Average for the rayon	81.4	100.0	4.9	11.9	27.7
"Russian" Collective Farm	97.5	100.0	6.3	6.4	5.2
		Krasnokholmskiy Rayon			

*Note for 1957.

Average for the rayon	68.2	87.2	4.9	12.7	42.5
Kuybyshev Collective Farm	93.1	100.0	6.5	10.3	100.0

The indicated collective farms are the most advanced in agricultural technology. The level of agricultural technology is considerably lower on the average in the rayons and the oblast. These collective farms carry out complete crop rotations and in all areas flax is sown after fall plowing and the best preceding crop -- a vigorous growth of second-year clover with a yield of 30-40 centners per hectare. In the oblast as a whole, crop rotation was introduced on less than one fourth of all the collective farms, and in Krasnokholmskiy Rayon on less than half. The average application of fertilizer in the oblast and the individual rayons was much lower than in the collective farms under consideration. On these farms sowing, harvesting, and the spreading of flax straw were carried out during the most favorable periods. As a result of differences in the level of harvesting technology, the yield of flax fiber in the rayons was 1.5 times higher than in the oblast' as a whole, and on the advanced collective farms twice as high.

Direct expenditures in man-days per centner of flax fiber were on the average 39.3% lower in Bezhetskiy Rayon and 35.2% lower in Krasnokholmskiy Rayon than in the oblast as a whole. Labor productivity on the "Russia" Collective Farm was over 3 times higher, and on the Kuybyshev Collective Farm almost twice as high, in comparison with the oblast.

All this indicates that in flax raising there are great unexploited resources for increasing yield and labor productivity. Even in the advanced flax-growing region of Kalinin Oblast and its best rayons and collective farms there are unutilized potentialities for a further growth in labor productivity.

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